

CARIBBEAN REGIONAL TRAINING MANUAL

ENVIRONMENTALLY SOUND TOURIST FACILITY DESIGN AND DEVELOPMENT FOR THE TOURISM INDUSTRY



Supported by:



Organized by:



JANUARY 1999

The compilation and editing of this Manual was commissioned by UNEP, United Environment Programme from Eleanor B. Jones of Environmental Solutions Ltd., Kingston Jamaica, under the USAID/UNEP Caribbean Environmental Network (CEN) Project (CR/FP/0401-94-15[CP/0401-94-47]).

The designations employed and the presentation of the materials in this document do not imply the expressions of any opinion whatsoever on the part of UNEP concerning the legal status of any State, Territory, city or area, or its authorities, or concerning the delimitation of their frontiers or boundaries. The document contains the views expressed by the authors acting in their individual capacity and may not necessarily reflect the views of UNEP.



UNEP

© 1999 UNEP - United Nations Environment Programme
Caribbean Environment Programme
14-20 Port Royal Street
Kingston, Jamaica, W. I.



USAID - United States Agency for International Development
2 Haining Road
Kingston, Jamaica, W. I.



CAST - Caribbean Alliance for Sustainable Tourism
1000 Ponce de Leon, 5th floor
San Juan, Puerto Rico
00907 USA

This Manual was developed by



CARIBBEAN INFRA-TECH, INC.

Caribbean Infra-Tech, Inc.
St Croix, US Virgin Islands
(Box 5370, Sunny Isle V. I. 00823-5370)

This publication may be reproduced in whole or in part and in any form for educational and non-profit purposes without special permission from the copyright holder, provided acknowledgement of the source is made. UNEP would appreciate receiving a copy of any publication that uses this material as a source.

No use of this publication may be made for the resale or for any other commercial purposes whatsoever without prior permission in writing of UNEP.

For bibliography purposes document may be cited as:
UNEP/USAID/CAST: Caribbean Regional Training Manual on **ENVIRONMENTALLY SOUND TOURIST FACILITY DESIGN AND DEVELOPMENT**
UNEP/Caribbean Environment Programme, Kingston. 1999. 130 pages

EXECUTIVE SUMMARY

Environmentally Sound Tourist Facility Design and Development is presented as an educational and instructional Manual to assist in the training of environmentalists and development planners and to fill gaps in knowledge related to environmental aspects of tourism activities.

The Modules which have been developed for this Manual are centered around specific themes including the environmental impacts of tourism facility design, the essential resources of coastal environmental systems, local and regional coastal regulatory systems, sustainable project planning, sustainable infrastructure and development masterplan, building designs and an outline of operational maintenance and monitoring systems.

It has been recognised that "greener tourism" within the Wider Caribbean region cannot happen without fundamental changes in the process of project/facility design and development. The conventional processes have produced a current stock of tourism developments which are not sustainable. A new proposed Central Development Process is being advocated which is more holistic in approach and more environmentally focused. This new process offers a framework for the entire development process, from project pre-planning and site selection through facility post-occupancy.

The natural resources of the region must be taken into account when designing for tourism. This extends beyond recognition of the natural systems to include resource management, environmental economics and general development planning. Resources are generally categorised as "stock resources" and "flow resources". Stock resources are developed over time and provide raw materials for general use, while flow resources are renewable resources as they are regenerated over a relatively short time span. Sustainable systems design demands a balance between the two sets of resources.

Inappropriate design and siting of tourism facilities impacts negatively on the environment. Natural events often reek havoc on the environment, but man-made designs can determine the level of impact of these natural phenomena on the environment. Poorly designed facilities are at greater risk to devastation. In the event of disasters, critical facilities that are likely to suffer include high-density facilities, transportation nodes, utility services and industrial, agricultural and social infrastructures.

Sustainable planning is, therefore, a critical issue in the siting of tourism facilities. This involves ecologically-based strategies which are environmentally, culturally and economically-sound. All stakeholders including the public sector must begin by formulating and reviewing potential sites before final selection for development. Environmental Impact Assessments and Carrying Capacity Instruments are tools which can assist in this process.

Sustainable systems such as wastewater treatment and renewable energy systems must be considered, where possible. Factors to be considered include appropriate technology, environmental standards, best practice scenarios, operation, and maintenance and monitoring.

The new sustainable process incorporates guidelines for low-impact tourist facility design and development. It offers a step-by-step design process that departs from the traditional design processes. It is an integrated team design approach that incorporates the goals of sustainability as outlined in Agenda 21 and other blueprints, as well as the hallmarks of environmental stewardship.

FOREWORD

In 1983, the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region, the Cartagena Convention, was adopted and serves as the legal framework for the Caribbean Environment Programme. It is the only comprehensive environmental umbrella treaty for the region. Two Protocols have been adopted on specific aspects of environmental management: the **Protocol Concerning Cooperation in Combatting Oil Spills** and the **Protocol Concerning Specially Protected Areas and Wildlife**. A third Protocol Concerning Land-based Sources of Marine Pollution is under development.

The Regional Programme for Specially Protected Areas and Wildlife in the Wider Caribbean Region (SPAW) was designed to implement the provisions and requirements of the SPAW Protocol. In keeping with the objectives and spirit of the SPAW Programme, the Caribbean Environment Programme (CEP) embarked on a new but integral component of the Programme - the Caribbean Environment Network (CEN) Project - aimed at improving environmental quality and the conservation of natural resources of the coastal and marine environment.

The CEN Project focused on reducing environmental impacts by tourism, given the importance and scope of the industry in the Wider Caribbean and its close linkages with various marine and coastal habitats in the region. It was designed in response to the Regional Agenda for Action of the International Coral Reef Initiative (ICRI), with the input of relevant partners in the region. This Project was a joint venture with the United States Agency for International Development (USAID) in Jamaica as the main donor agency with the support of a Technical Consultative Committee established with key agencies in the region including: British Development Division (BDD/ODA), Caribbean Tourism Organization (CTO), Caribbean Development Bank (CDB), French Cooperation Division, Inter-American Development Bank (IDB), Pan-American Health Organization (PAHO), University of the West Indies- Centre for Marine Sciences, United Nations Development Programme (UNDP) and the World Bank.

This Manual is one in a series of three products emanating from the CEN Training Programme. They were developed and implemented to fill gaps in knowledge related to environmental aspects of tourism and the marine environment in three major areas: Solid and Wastewater Management; Design and Siting of Tourism Facilities; and Integrated Coastal Area Management.

The above areas addressed by the Training Programme evolved mainly from a Training Needs Assessment commissioned by UNEP from the Consortium of Caribbean Universities for Natural Resource Management (CCUNRM), and a report prepared by the Panos Institute on Improving Training and Public Awareness on Caribbean Coastal Tourism. The Training Needs Assessment exercise had inputs from a Consultation Meeting organised by CCUNRM (Puerto Rico, 22-23 October 1996) and a survey through questionnaires sent to a wide variety of stakeholders in the region based on a set of criteria including experiences in education, tourism and marine environment issues. Care was taken to include a diversity of Caribbean countries in terms of size, language and tourism activities.

The overall objective of the Training Programme was to assist in the development of institutional capacity in the region on coastal resources and ecosystem management related to the tourism industry. Seven courses in English and Spanish were delivered under the CEN Project with over 100 participants from the Dutch, English, French and Spanish Speaking Caribbean, representing 28 countries (including territories and dependencies) in the region. Participants also represented a cross-section of public, private and academic institutions involved in different aspects of tourism and coastal environment issues, such as developers, hotel managers, coastal area planners and managers, technical staff from Governments and water conservation authorities.

Materials from the Training Courses have been compiled and consolidated to produce this series of Training Manuals, which it is hoped will serve as reference materials for wide dissemination and assist in promoting replicability of the training experience throughout the Wider Caribbean.

A number of other regional and international organisations have embarked on programmes to improve environmental practices towards achieving sustainable tourism in the region. It was the goal of the USAID/UNEP CEN Project to contribute to these efforts in support of sustainable use and conservation of coastal zones and resources in the Wider Caribbean region.

ACKNOWLEDGEMENTS

Many persons have shared experiences, ideas and information which have contributed to this Manual. In particular, appreciation is expressed for the technical inputs made by:

- ↪ Mr. Kamau Akili, Environment Tobago, Trinidad and Tobago
- ↪ Ms. Denise Forrest, Environmental Solutions Limited, Kingston, Jamaica
- ↪ Mr. Lloyd Gardner, ECOTECH Inc., Kingston, Jamaica
- ↪ Mr. Mark Gruin, Greenpoint Limited, Hershey, PA, USA
- ↪ Dr. Oliver Headley, the University of the West Indies, Bridgetown, Barbados
- ↪ Mr. Onaje Jackson, Caribbean InfraTech, St. Croix, US Virgin Islands
- ↪ Dr. José Lopez, University of Puerto Rico, Humacao, Puerto Rico
- ↪ Ms. Lilia Medina, Town and Country Planning, City of Miami, FL, USA
- ↪ Dr. Alida Ortiz, University of Puerto Rico, Humacao, Puerto Rico
- ↪ Dr. LaVerne Ragster, University of US Virgin Islands, St. Croix, US Virgin Islands



THE MANUAL

OBJECTIVES:

This Training Manual is being presented as a practical instructional tool to assist in human resource strengthening for the development of tourism which is environmentally sustainable in the Wider Caribbean Region. It introduces the concept and presents a new framework for project development based on sustainable infrastructure and practices for the Design and Siting of Tourism Facilities and their value to the tourism industry. Although the Manual is not intended to serve as a textbook for the tourism industry or as final authoritative guidelines, it provides overall principles based on the current state of knowledge for the sustainable design and siting of tourism facilities.

TARGET AUDIENCE:

This Manual was produced as an introduction to the design and siting of tourism facilities for all of those who are actively involved or interested in the planning, development and construction processes of facilities, and their environmental dimension, within the tourism sector and the environmental community alike. These include hotel and tourism facility developers, tourism development companies, coastal managers and town planning staff, architects and engineers, as well as other stakeholders from local community associations and policy decision-makers.

Many issues addressed by the Manual are also of relevance to students and teachers in tourism at engineering, architectural and environmental schools and universities.

CONTENTS AND USE:

Seven Modules have been developed to introduce general background topics in early modules, which will contribute to a proper understanding of subsequent modules. These modules are geared towards reducing the potential environmental impacts of the tourism industry on coastal and marine resources in the Wider Caribbean Region and can be summarised as follows:

- Module 1: Examines the environmental impact of tourism facility design, and provides images of high and low impact tourism facilities
- Module 2: Introduces essential resources of coastal environmental systems and describes the common environmental damages caused by poor tourist facility design
- Module 3: Focuses on local and regional coastal regulatory systems and gives an overview of regulatory instruments

- Module 4: Highlights sustainable project planning and the importance of planning in project development
- Module 5: Introduces the concept of sustainable infrastructure and sustainable development masterplan.
- Module 6: Provides sustainable building design guidelines including a design checklist
- Module 7: Outlines monitoring guidelines for project sustainability with an introduction to Operations Maintenance and Monitoring (OM&M).

Users are expected to utilize the information presented in the Manual to advance the environmental design, construction and operation of tourism facilities as well as, as a tool for the assessment of environmentally sensitive developments including training opportunities, in their specific field of work.

TABLE OF CONTENTS

EXECUTIVE SUMMARY	i
FOREWORD	iii
ACKNOWLEDGEMENTS	v
TABLE OF CONTENTS	vi
THE MANUAL	xi
MODULE 1: IDENTIFYING THE CHALLENGES	1
OBJECTIVES and OVERVIEW	3
CENTRAL FRAMEWORK	5
The Current Conventional Process	6
Modification of the Conventional Process	6
The Central Development Process	7
THE PARTICIPANTS IN THE PROCESS	9
KEY ISSUES	10
MODULE 2: INTRODUCTION TO THE ESSENTIAL RESOURCES	11
OBJECTIVES and OVERVIEW	13
INTRODUCTION TO NATURAL RESOURCES	15
Natural Resources Defined	15
Stock Resources	15
RESOURCE UTILIZATION	17
Economic/Environment Linkages	17
Indirect Linkages	19
Other Indirect Linkages	19
Sources of Degradation	20
TOURISM AND THE ENVIRONMENT	22
Contribution of Tourism to Caribbean Economies	22
Projected Growth in Caribbean Tourism	23
DETRIMENTAL IMPACTS OF COASTAL TOURISM	24
Impact from Waste	24
Impact from Recreational Activities	25
Physical Change/Mechanical Action	25
Resource Over-use/Misuse	27
Carrying Capacity	28
Environmental Indicators	29

MODULE 3: COASTAL REGULATORY PROTECTIONS

33

OBJECTIVES and OVERVIEW	35
POTENTIALLY HAZARDOUS NATURAL PHENOMENA	37
Atmospheric/Hydrolic	37
Seismic Volcanic	37
Other Wildfire: Geologic/Hydraulic	37
ECOSYSTEM ATTRIBUTES AS NATURAL HAZARDS	37
EFFECTS OF NATURAL PHENOMENON DEVELOPMENT ACTIVITIES	38
EFFECTS ON CRITICAL FACILITIES	38
Public Safety and Security	38
High-Density Occupancy	38
Transportation	39
Utilities	39
Industrial	39
Agricultural	39
BUILDINGS ARE VULNERABLE TO HURRICANES	42
Site and orientation	42
Shape of the facility	42
Foundations	42
Framing and cladding	42
Roofs	42
CHECK FOR THESE STANDARDS	43
Porches	44
Shutters and Windows	44
MAINTENANCE IS IMPORTANT TO VULNERABILITY REDUCTION	44
Inspect	44
Proper maintenance should ensure that the facility can:	45
PREMISES AND PRINCIPLES OF INTEGRATED COASTAL AREA MANAGEMENT	46
TRADITIONAL VS. NON-TRADITIONAL APPROACHES	47
Traditional Management Approaches	47
More Recent Policy & Management Approaches	47
ENVIRONMENTAL REGULATORY & ECONOMIC INSTRUMENTS	47
PROJECT APPROVAL PROCESS	48
ISSUES CONSIDERED IN PROJECT ANALYSIS	48
Some Deficiencies in a Project-based Approach to EIA	49
Advantages of policy/plan EIA	49
Disadvantages of policy/plan EIA	50

MODULE 4: SUSTAINABLE PROJECT PLANNING 53

OBJECTIVES and OVERVIEW	55
INTRODUCTION	57
Pre-Project Planning	57
Site-Specific Planning	58
CARRYING CAPACITY ASSESSMENT	60
Limits of Acceptable Change	61
Visitor Impact Management	61
Rapid Sustainability Assessment Process	62
Environmental and Financial Feasibility	62
Disaster Mitigation	63
Master Site Planning	63
Completing the Sustainable Development Master Plan	64
Final review and other considerations	65

MODULE 5A: WHAT IS SUSTAINABLE INFRASTRUCTURE? 67

OBJECTIVES and OVERVIEW	69
DEFINING SUSTAINABLE INFRASTRUCTURE	71
Gather Baseline Resource Data	71
Complete Integrated Infrastructure Assessment	73
Economic and Socio-cultural Assessment and the Preparation of Preliminary Plans	73
Finalize Sustainable Development Master Plan	73
SUSTAINABLE SYSTEMS OPTIONS	73
Sustainable Waste Treatment Recycling Technologies	73

MODULE 5B: DESIGN AND OPERATION OF SELECTED SUSTAINABLE SYSTEMS 77

OBJECTIVES and OVERVIEW	79
WASTEWATER TREATMENT	81
Factors to consider in selecting technology	81
Approach to Treatment Designs	81
Best Practice Options	81
Best Practice Standards	82
CLASSIFICATION OF TREATMENT PROCESSES	82
Primary Treatment	82
Secondary Treatment	82
Activated Sludge Process	84
Tertiary Treatment	84
Non-conventional - Wetlands Wastewater Treatment	86
Disposal Options	87
Operation and Maintenance	88
Summary of Key Considerations	88
RENEWABLE ENERGY SYSTEMS	88
Choosing the Right System	89

MODULE 6: SUSTAINABLE BUILDING DESIGN GUIDELINES 91

OBJECTIVES and OVERVIEW	93
INTRODUCTION	95
Guidelines and Checklists: A Practical Application	95
SUSTAINABLE TOURISM FACILITY DESIGN: Defining the Product	95
Design and Siting of Tourism Facilities	95
SUSTAINABLE TOURISM FACILITY DESIGN: Process Guidelines	96
Overview of the Conventional vs. The Sustainable Design Process	96
Steps in the Sustainable Design Process	96
SUSTAINABLE TOURISM FACILITY DESIGN: Checklist	98
Facility Design Checklist	98
Facility Infrastructure	99
The Structural System	100
Energy Systems	100
HVAC Systems	100
Potable Water Supply Systems	101
Wastewater Systems	101
Solid Waste Systems	102
Communication Systems	102
FACILITY ORIENTATION	93
Other Key Inputs	103
FACILITY FOOTPRINT	103
FACILITY MASSING/FENESTRATION DESIGN	104
Other Key Inputs	104
FACILITY BUILDING MATERIALS	104
SUSTAINABLE FACILITY CONSTRUCTION	105
Waste Reduction	105
DRAFT COASTAL DEVELOPMENT GUIDELINES	105
Construction Site Plan	105
Revegetation/Landscaping	107
Pier, Mooring Etc.	108
Sewage Waste Disposal	108

MODULE 7: MONITORING PROJECT SUSTAINABILITY	109
OBJECTIVES and OVERVIEW	111
INTRODUCTION	113
OPERATIONS, MAINTENANCE, AND MONITORING (OM&M)	113
What is OM&M?	113
The Primary Functions of OM&M	113
Special Monitoring "Tools"	114
SPECIAL OM&M ISSUES FOR THE CARIBBEAN	114
ENVIRONMENTAL MANAGEMENT	114
HOW TO USE THE ACTION PACK	114
INTRODUCING AND DEVELOPING ENVIRONMENTAL CULTURE IN YOUR HOTEL	115
THE GREEN HOTEL IS GOOD BUSINESS	116
TWELVE STEPS TO A GREENER PLANET	117
RESOURCE CONSERVATION AND MAINTENANCE PROGRAMME (RCMP)	117
RCMP Goal	118
The Key to Programme Success	118
RENEWABLE ENERGY SYSTEMS	118
Systems description	118
The Components	118
How it Works	118
How to Maintain the System	119
SOLID WASTE MANAGEMENT PROGRAMME	119
Waste Reduction Programme	119
Waste Reuse Programme	119
Waste Recycling Programme	119
Composting Programme	119
ENERGY CONSERVATION PROGRAMME	119
WATER CONSERVATION PROGRAMME	119
GREY WATER PROGRAMME	119
BIBLIOGRAPHY	120
APPENDIX 1	123
APPENDIX 2	127
APPENDIX 3	129